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## A SIMPLE COMPLICATION PENDULUM FOR QUALITATIVE WORK.

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An experiment is described in Titchener's Laboratory Manual, i, S. M., 115, to demonstrate the law of attention that "the process attended to rises more quickly than other processes which enter consciousness simultaneously with it." The apparatus required is a bell metronome. The two simultaneous stimuli are the click of the metronome and the sound of the bell.

Under favorable conditions, the experiment may be successfully performed. The observer, by attending mainly to the click or mainly to the bell, is able to alter the apparent temporal relation of the two impressions. There are, however, two general objections to the method. In the first place, the fact that the two impressions belong to the same sense department is a real difficulty for novices,—sometimes even for experienced observers who have not had special practice. A second objection is that the succession of clicks and tones tends to fall into a subjective rhythm, in which now the noise and now the bell-sound may be accented. This accentuation gives the accented member of the series a greater hold over the attention, so that the verification of the law may be helped or hindered in a way not allowed for by the experiment.

A simple device for the simultaneous presentation of two impressions from different sense departments can be made with a bell metronome and a piece of cardboard. The cardboard is cut in the form of an arc of a circle whose radius is the length of the metronome pendulum. Scale divisions of  $5^{\circ}$  are laid off on the circumference. The cardboard arc, with the  $0^{\circ}$  of the scale corresponding to the position of equilibrium of the pendulum, is impaled on the eye which serves to lock the lid of the metronome. In this position, the white cardboard, bearing its scale, forms a background, in front of which the pendulum oscillates. A piece of red paper, cut in the shape of an arrow-head, may be spitted on the pendulum to make its movements more conspicuous. The metronome should be set to beat about 72 times in the 1 min. with the bell ringing at every complete oscillation of the pendulum. One has, by this arrangement, the simultaneous presentation of a visual and an auditory impression. The position of objective coincidence can be found, approximately, by slowly moving the pendulum with the hand, until the bell sounds. With this apparatus the experiment is performed by directing the attention, in the one case, mainly to the red arrow-head, and, in the other, mainly to the bell, the experimenter reading off from the scale the position of the arrow in each case. Objective simultaneity, for the metronome used in the Cornell Laboratory, came at  $22^{\circ}$ . When I attended mainly to the arrow, the bell seemed to ring at  $30^{\circ}$ ; when I attended mainly to the bell, the arrow was between  $10^{\circ}$  and  $15^{\circ}$ . Similar results were obtained by other observers.

This experiment, of course, inverts the conditions of the 'complication experiment,' in which nothing is said about the voluntary shift of attention. But inasmuch as the rate of the metronome pendulum can be varied, the apparatus could be used for qualitative complication work.